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Firm relocation

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Document Version

Publisher's PDF, also known as Version of record

Publication date:

2002

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Pellenbarg, P. H., van Wissen, L. J. G., & van Dijk, J. (2002). *Firm relocation: state of the art and research prospects*. University of Groningen, SOM research school.

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FIRM RELOCATION: STATE OF THE ART AND RESEARCH PROSPECTS

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SOM-theme D: Regional Science

Abstract

This paper deals with firm relocation. Firm relocation is a particular form of locational adjustment of the firm and one of the possible ways to adjust to changes in markets, preferences of consumers, environmental regulations, technological progress etc. In section 2 we will treat the neo-classical, the behavioural, and the institutional approaches respectively. Next, a historical review of firm relocation research is presented, in section 3. It starts with the "classical studies" of the first post-war period, followed by a description of what can be called the golden era of firm relocation studies according to the large number of studies: the nineteen sixties and seventies. This section ends with an overview of firm relocation studies of the last decades of the previous century. In section 4 we present an example an empirical study that addresses relevant firm relocation for the present era by means of a statistical model estimated on data for individual firms of the Netherlands. We conclude the chapter with a discussion of why and how the firm relocation research frontier can be pushed forward and give suggestions for further research also in relation with policy.

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1 Introduction

Due to changes in markets, preferences of consumers, environmental regulations, technological progress etc. firms are constantly adjusting to new situations. The constant adjustment process of firms very often also has a spatial dimension. Characteristics of the spatial environment of a firm may change over time, but also internal changes in firms may lead to other locational preferences. Firm relocation is a particular form of locational adjustment of the firm. Here, we define firm relocation as a change of address of a firm from location A to location B. This definition is most suited for small and medium sized single plant firms, but less for multi-plant firms and large enterprises.¹ A very simple relocation case is that of a growing firm facing the problem that the present building is too small to host all activities. Moving to another building is then an obvious solution. For large enterprises locational adjustment usually involves the restructuring of the spatial layout of activities, that are spread out over multiple locations. These complex events can only partially be labelled as relocation. Often, the relocation component is but one element in a mix that also includes closing down, merging and splitting off of business units of the enterprise. These events are certainly extremely interesting from a geographical or spatial point of view. All these events are taken into account in a demographic approach to firm dynamics that has gained popularity in recent years (Van Dijk and Pellenbarg 2000a). This approach, which is studied both by geographers, sociologists and economists is called industrial demography, demography of the firm or enterprise, or economic demography (Van Wissen, 2000a). In this chapter we will limit ourselves to the discussion of the basic form of firm relocation: a firm moves from location A to B.

To get insight in the relevance and scope of firm relocation we start with an overview of theories which shed light on firm relocation and the underlying causal factors. In section 2 we will treat the neo-classical, the behavioural, and the institutional approaches respectively. Next, a historical review of firm relocation research is presented, in section 3. It starts with the "classical studies" of the first post-war period, followed by a description of what can be called the golden era of firm relocation studies according to the large number of studies: the nineteen sixties and seventies. This section ends with an overview of firm relocation studies of the last decades of the previous century.

¹ For a discussion about the problems related to the proper definition of firm relocation both theoretically and in the context of data availability, see Van Dijk and Pellenbarg (2000a, p.98-99).

In section 4 we present an example an empirical study that addresses relevant firm relocation for the present era by means of a statistical model estimated on data for individual firms of the Netherlands. We conclude the chapter with a discussion of why and how the firm relocation research frontier can be pushed forward and give suggestions for further research also in relation with policy.

2 Theoretical aspects

Economic geography, or more specific, location theory, has witnessed a proliferation of theories and approaches in the last two decades, none of which seems to dominate the field at present (Scott, 2000). A clear paradigm is missing; instead, *(almost) anything goes* (Bryson et al., 1999). Therefore, we will give an overview of several approaches which seem to be useful to get more insight in firm relocation and the underlying (decision) processes. Broadly speaking, following Hayter (1997) and Machlup (1967), a division in three types of location theories may be made: a neo-classical, a behavioural and an institutional approach. For a general overview of location theories we refer to Hayter (1997) and references therein. Here, we are not dealing with location theories *per se*, but with *relocation* theories. Theories about firm relocation *sec* are rare. In general, they are treated as a special case of one of the location theories. Firm relocation differs from firm location because it explicitly takes account of the fact that one location is substituted for another. The firm has a history, and this history is likely to have an influence on the locational outcome of the process. This locational outcome is therefore a *conditional* one. The specific nature of these conditional effects is important for any theory of firm relocation. Another way to look at this is to separate the relocation process into two sequential steps: first the decision to move, and second, conditional upon a move, the decision to relocate to an another location. A similar distinction is between *push* and *pull* factors of migration. Location theory focuses on the optimal locational choice, which is about locational factors determining the attractivity of a site for firm location, or *pull* factors. Relocation theory also takes into account the first step, the *push* out of the present location. In this section, we will emphasise both elements of relocation. We follow the classification in three types of location theories given above.

The neo-classical approach

The neo-classical approach, which is derived from standard classical economic theory, focuses on cost-minimising or profit-maximising theories. General principles of the classical location theory, which goes back to Adam Smith, are given in Isard (1956).

In Weber's approach ((1929), the transportation costs of industry inputs and outputs determine a least transportation-cost surface. Other location factors, such as labour or external economies, determine similar least-cost surfaces. By aggregating the cost surfaces of all location factors a total-cost surface is derived. In a similar vein, a spatial revenue surface may be calculated. The firm is able to make a profit in any location where total revenues exceed total costs. By subtracting the total cost surface from the revenue surface, the total area is divided into profitable and unprofitable areas. In this regard, the concept of the *spatial margins to profitability* for a firm may be defined (Rawstron, 1958; Taylor, 1970; Smith, 1966, 1971; McDermott, 1973). These margins enclose the spatial area within which the firm is able to make a profit.

In an equilibrium situation, the optimal location for the firm is fixed, and relocation is not necessary. However, both the firm and the environment may change over time, which may be denoted as firm internal and external factors. Factors external to the firm are, for instance, changing factor prices, or changing external effects (e.g. congestion). These will lead to a changing shape of the cost- and revenue surfaces, and, hence, of the spatial margins to profitability of the firm. Firm internal factors may relate to expansion or to the changing character of the production process. This may result in a different combination of factor inputs, and in turn to changing spatial margins to profitability. Assuming that location costs and revenues change over time, we find that most existing firms do not occupy the 'optimal' profit maximising location. Nakosteen and Zimmer (1987) provide a theoretical framework in which firm continuously monitor their profits relative to a fixed target threshold. As long as the firm exceeds this profit rate (or in other words is within the margins to profitability) the firm will most likely stay at the present location and will not try to move to the 'optimal' location, for three reasons.

First, there may be significant relocation costs. Relocation costs may be direct costs of moving, as well as search and information costs of finding new markets, labour, suppliers and deliverers, etc. A move to another geographical market is to a certain extent similar to a start-up, with large investments, and uncertain revenues.

However, these types of indirect costs are generally disregarded in the simple neo-classical framework, with its emphasis of full information and rational behaviour. Second, there may be a substantial amount of capital inertia (Auty, 1975). For instance, in many cases existing buildings and other equipment at the old location may already be written off, and still be operational at low costs. The firm is therefore able to make a profit at a sub-optimal location where a new firm would not be able to make a profit. Third, the cost- or revenue-elasticity of any of the location factors is in general low, which means that the cost- and revenue surfaces are rather flat. In other words, locational choice is often not a decisive factor in determining profit or loss. The firm may choose between many sites that are almost equally profitable. Only when at another location the profits are much higher the firm may decide to relocate in spite of the fact that also at the present location they make a profit.

The other possible outcome of the monitoring may be that due to the changing shape of the cost- and revenue surfaces the current location is no longer inside the spatial margins to profitability. Then adjustments are necessary, otherwise the firm will fail. Besides other adjustments, spatial adjustments may be able to solve this problem. One of the most common forms of internal change of the firm is growth, which is often driven by process innovation and resulting economies of scale. Within the neo-classical framework of the spatial margins to profitability this means that the level of the cost surface is higher for small firms than for large firms *in all locations*, and these margins span a larger area for larger firms. Then the level of the cost surface for small firms will be higher than the revenue curve everywhere. Therefore, small firms cannot escape failure by relocating to another location, but must grow in order to remain profitable. Here, the firm faces a trade-off between on-site expansion (intra-site growth), relocation to another -larger- site, or setting up one or more new sites (inter-site growth). This distinction is similar to Krumme's (1969a) division in three types of spatial adjustments. If the firm chooses to relocate, it is not driven by the traditional location factors, but by the need to adjust to internal dynamics. Many empirical studies point to the need for expansion as the most important trigger of firm relocation (see e.g. Louw 1996, Pellenbarg 1985, 1995). It is also possible that economies of scale can only be realised at particular locations (for instance urban areas with a large market) where at other locations (rural areas) this is not possible. The spatial adjustment process to firm growth in relation to the external environment is one of the key explanatory factors of firm relocation, which may be explained by the internal dynamics of the firm, a process that also fits in a neo-classical framework. Nevertheless, it has not received much attention in neo-classical location theory, with its focus on external location (pull) factors.

The spatial dimension has got renewed interest in mainstream economics since the beginning of the nineties due to the work of Krugman c.s. on what is labelled as the 'New economic geography' (see for instance, Krugman 1995; Fujita et al. 1999). According to Neary (2001, p.536): "The key contribution of the new economic geography is a framework in which standard building blocks of mainstream economics (especially rational decision making and simple general equilibrium models) are used to model the trade between dispersal and centripetal forces." Although mobility of economic activities is a crucial adjustment mechanism in these models to explain agglomeration, Neary (2001, p.549-550) argues that the "model has almost nothing to say about individual firms. Except for the fact that it incorporates increasing returns, the new economic geography has industrial organisation underpinnings which are very rudimentary. In particular, the assumption of free entry - a perfectly elastic supply of firms at all locations - allows almost no role for strategic interactions between firms. As a result while cost are fixed they are never sunk, so firms, industries and even cities are always free to move. Footloose cities seem particularly odd." Because in the new economic geography model space is one-dimensional and firms are identical and infinitesimal these models have hardly anything to offer that is valuable for the explanation of the actual spatial behaviour of firms. In this respect micro-economic models based on neo-classical ideas but extended with search behaviour and taking into account uncertainty have more to offer.

Summing up, we may conclude that neo-classical *relocation* theory not only focuses on location factors that are well covered in location theory, and could be denoted as locational *pull* factors, but also covers the factors triggering a relocation, the *push* factors. The spatial margins to profitability discriminate between profitable and unprofitable locations, and are therefore useful in determining where a firm should locate (*pull*). However, as it turns out they usually span quite a large area within which firms may operate profitably. Changes in these boundaries are therefore often not sufficient in explaining *why* firms want to move (the *push* factors). In addition, we have to look for internal processes within the firm, of which firm growth as a result of economies of scale is the most common one.

The behavioural approach

The simple neo-classical theory is useful as a benchmark that defines the "optimal" behaviour of the firm in economic terms, under the assumptions of rationality and perfect information. However, it does not take into account the internal dynamics of firms in a context with imperfect information and uncertainty where profit maximising behaviour is not the ultimate goal.

This motivated Simon (1955, 1957) and Cyert and March (1963) to develop a behavioural theory of the firm, which is based on more realistic notions of limited information and bounded rationality. Here, optimising behaviour is replaced by 'satisficer' behaviour. The behavioural approach was also successfully introduced in location theory, primarily by Pred (1967, 1969). The behavioural approach became popular in all branches of human geography (Cox and Golledge, 1981; Harvey, 1969). Apart from the general points of criticism towards neo-classical theory, the application of these behavioural ideas in location theory was also motivated by the limited discriminating power of regional economic conditions in determining the optimal location of industries (Benoit, 1995), or, equivalently, spatial margins to profitability approach (Hayter, 1997). If regional economic conditions show limited variation this leaves many profitable sites to choose from. Than firm specific economic factors or non-economic factors may become of more importance for the explanation of firm relocation. The behavioural approach takes these factors explicitly into account.

The behavioural approach is especially geared towards firm relocation. We noted above that the key difference between location and relocation theory is that location theory is more concerned with locational pull factors, whereas relocation also deals with push-factors: the trigger to moving. This fits directly into a simplified description of the decision process of the firm. In fact, usually more than two phases are distinguished (Dicken and Lloyd, 1977, Hayter, 1978, 1997): (1) the decision whether to move or not; (2) the search for alternative locations; (3) the evaluation of alternative locations; and (4) the choice of the new location. A fifth stage might be added in which the implemented decision is assessed and evaluated. In view of our emphasis on relocation theories, with equal interest in push and pull-factors, we note that this staging of the process has a similar bias towards the locational pull-factors as neo-classical theory. The decision to move is considered to be one step, but following (1969a), relocation is one possible outcome of an adjustment to change process. Adjustment may also be sought in reorganisation, or in other investment strategies. Moreover, spatial adjustments may be in the form of on-site change, in inter-site reorganisation, and opening up of new sites. The decision to relocate is therefore the outcome of a complicated decision process that may involve more than one stage and feedback's between the various stages. Other possible outcomes may be for instance on-site expansion, or the opening of a new subsidiary plant, without the closing down of the old site (Schmenner, 1982).

Apart from the decision making process, which is made explicit, there are four key elements in behavioural location theory: (1) the role of limited information, (2) the ability to use information; (3) perception and mental maps; and (4) uncertainty.

These elements were combined by Pred (1967, 1969) into the behavioural matrix, where firms are classified along two dimensions, viz. (1) the availability of information, and (2) the ability to use information. Firms with high information levels and a large ability to use it come close to the classical “Homo economicus”, and may be expected to locate near optimal. Firms at the other end of the scale know little and cannot utilise this information, and thus may be expected to locate at less profitable or unprofitable locations. Many of them will fail in the end. Despite its simplicity and popularity, Pred’s behavioural matrix offers no more than a conceptual basis for constructing a behavioural location or relocation theory (McDermott, 1973). In the behavioural theory, it is the perception of reality, not only reality in itself that matters. Mental maps (Abler et al., 1971; Cox, 1972), the perception of the geographic configuration, is what people use in their spatial decision making. These ideas were central to the work of Pellenbarg (1985) and Meester (1999), in their work on firm relocations.

Limited information, limited ability, perception and uncertainty all lead to a large spatial bias in relocation decision making. First, more distant locations are less well known and therefore it is likely that nearer locations are chosen more frequently. Second, distant locations are more difficult to imagine than nearer places. Third, there is a strong distance decay in mental maps, which is of course partly related to the amount of information, but also with the perceived attractiveness of the place. Finally, firms face uncertainty, not only because they have a knowledge gap or are not able to digest the available information, but also because investment decisions are based on anticipated future situations, which are by definition uncertain. Anticipating the future for other locations that are not familiar adds to the uncertainty. The larger the relocation distance, the larger the amount of uncertainty about future points in time. On-site investments are therefore much more certain than investments in a new site. Relocation to another geographical market may even be comparable to the inherent uncertainty of a start-up.

As a result of the behavioural approach to firm relocation, a large body of literature has developed that gives detailed descriptions of motives and reasons for moving, both on the *push*- and the *pull*- side of the process. Frequently given *push*-reasons are both internal and external to the firm. Again, the main internal reason is related to firm growth: limited expansion space at current location, or limited representativity of the present location (the need for it usually increases with the size and age of the firm). External factors include limited accessibility, deterioration of the building, environmental considerations, limited labour supply, or high location costs. Pull-factors are largely the opposite of the internal factors: enough space, accessibility to deliverers, suppliers, customers, the labour market, representativity, low costs, and often also locational amenities, such as the housing market, environmental conditions.

We may conclude that the behavioural approach adds to the neo-classical view, by exploring the many motives, both economic and otherwise, that are important in the decision making process of the firm, and that leads to a particular location. The approach seeks to understand actual behaviour of entrepreneurs, and focuses on the decision making process, that may lead to a relocation and takes also path dependency into account. On the one hand this is very valuable information, for understanding and policy making, but at the same time it shows the weaknesses of the approach. Often based on questionnaires and detailed empirical work, it is largely descriptive and explorative and to a much lesser extent an explanatory model. Similar to the neo-classical framework, too much attention is given to locational factors as such, and the link with internal firm processes of production, investment and growth is weak (see also Sayer, 1982). Another drawback is that the behavioural approach focuses too much on sociological, psychological and other 'soft' variables (Scott, 2000) often ignoring the (neo-classical) economic factors. Therefore, an eclectic combination of the behavioural and neo-classical approaches seems to be more fruitful.

Institutional approaches

The neo-classical and the behavioural approach have one view in common: the firm as an active decision making agent in a static environment. The firm has to choose from a number of alternatives. In doing so, it takes economic and non-economic factors into account, and the decision-maker is either 'homo economicus' or 'satisficer man'. In either view the environment is a surface of location factors, or a 'bed of information' that is processed by the firm (Hayter, 1997). In the eighties this simplistic view of locational behaviour of the firm was increasingly being questioned in a number of new research directions. These new developments, no matter how different they may work out, share one common belief that economic processes in space are mainly shaped by society's cultural institutions and value systems. In other words, we have to look, not only to the behaviour of the firm, but also to the social and cultural context in which this behaviour is embedded. Institutional approaches have dominated the field since then (Martin, 1999). Although some mainstream economists have discovered the spatial dimension as a key factor in economic theory (Krugman 1995; Fujita et al. 1999), and labelled it the 'New economic geography', it is interesting to note that many 'traditional' economic geographers have turned away from this field, and now may be labelled institutional geographers. Among them are neo-Marxist theorists, feminist geographers, cultural geographers, and many others. For (re-)location theory most of these approaches are less relevant, except for the 'geography of enterprise' (see Krumme, 1969b).

The 'geography of enterprise' views the firm in interaction with its environment, which is a regional system, or *industrial district* (McNee, 1958, 1960; Hayter, 1997).

Firms have to negotiate with deliverers and suppliers, local, regional or national governments, labour unions and other institutions, about prices, wages, taxes, subsidies, infrastructure, and other key factors in the production process of the firm. Locational behaviour is the result of the outcome of these negotiations. The implication of this view is that the geography of enterprise is more suited for large corporations. Larger corporations have more negotiating power, and are able to exert a substantial influence upon their environment, whereas small firms usually have to accept the restrictions and constraints imposed upon them by their environment (Hayter, 1997). Regional systems are important contexts for firm growth. Important examples are Silicon Valley or Emilia-Romagna. These regions have a particular favourable entrepreneurial culture, in which key resources such as venture capital and knowledge are shared through intensive networks. In this regard, new terms were introduced, such as incubator regions, new industrial spaces, learning regions, etc. (Scott, 1995, 2000).

These terms may be important as general concepts that help to understand historical processes of regional growth, and the evolution of particular corporations, but they are less helpful in explaining actual locational behaviour of the many small and medium sized firms in the economy. In general, most attention is focused on larger corporations. Nevertheless, small and medium sized firms also operate in an institutional environment, which has a significant impact on their locational behaviour. There are two types of institutions that are important for (re)location behaviour of small and medium sized enterprises: governments and the real estate market. Whereas in the sixties and seventies the role of the government in relocating economic activities was large, at least when viewed from many regional policy intentions in those days, nowadays it is more modestly seen as largely facilitating or inhibiting locational choices of firms. We will come back to these policy issues in the next section. Governmental facilitating factors are for instance infrastructure, zoning, subsidies and tax reductions. Fiscal incentives and subsidies may produce a local trough in the cost surface, which may have the effect that some locations are now inside the spatial margins to profitability (Abler et al., 1971). The role of government is important for constraining and restricting firm behaviour as well. Again, zoning regulations are important, but, for instance, also environmental regulations. An exceptional case of the role of institutions is the influence of the government of South Africa on the stimulation of firm relocation to the homelands under the apartheid regime (Fox and Nel, 2000).

The real estate market is an important institution for firm relocation, but geographical studies dealing with the effects of this institution are scarce. Ball (1998)

investigated the impact of financial institutions on office location in London. Louw (1996) focussed on the role of office accommodation in office location. Small firms are usually dependent on existing demand on the real estate market for commercial property. Therefore, the spatial characteristics of supply of real estate (office space, industrial sites, commercial floorspace) are of prime importance for understanding locational choices of small firms. The role of commercial real estate developers should be taken into account as well.

The three above-mentioned schools of thought on location provide the theoretical background for studies of firm relocation. However, most empirical studies in the field of firm migration were not initiated by scientists but by policy makers who had to solve practical planning problems or had to stimulate economic or employment growth. In the next section, a historical review is presented of firm migration studies. This historical context is cast in the more general economic and policy context of the time, which formed the main triggers for many of these studies.

3 A historical review of firm relocation studies

Classical studies on firm relocation

The earliest known study on firm relocation, at least the earliest one which is mentioned rather regularly in the international literature on firm location, is beyond any doubt McLaughlin and Robock's study *Why industry moves South* (McLaughlin and Robock, 1949). This book describes the mid-century shift of manufacturing industry in the United States from its original concentration area in the Northeast to the South-eastern states, where low cost labour was more abundantly available and trade unions were less active. McLaughlin and Robock in this "classical" study thus stressed the importance of firm external factors, in their case this was the external pressure in the form of increases in labour cost and militancy in the US Northeast. Another publication in the US of this early post-war period (Garwood 1953) concentrates on industrial moves to Utah and Colorado and highlights the influence of other external factors, viz. markets and materials. Later studies, such as the ones undertaken by Mueller et al. concerning the state of Michigan (1961) and the UK studies of Luttrell (1962), Cameron and Clark (1966), Keeble (1968) and Townroe (1972) proved that also firm internal factors may be very important as causes of firm migration. This is especially true for the internal pressure resulting from growth in output. Nevertheless, the main focus of firm migration research during the nineteen fifties and sixties is definitely not yet on such firm internal factors and

processes. Rather it is the outside world of the firm, more especially the external circumstances that push the firm from the old location and/or pull it to the new one.

The impact of firm relocation processes on local and regional economic structures and the possibilities of influencing firm relocations through local and regional policy instruments are core interests of researchers in this period. There is an interesting parallel between the evolution of regional economic policies and the research focus on firm relocation studies. The focus on firm relocation studies in this period had a close parallel in population migration studies, especially in Europe. Redistribution of people and work became important topics in a time of rapid demographic and economic growth in the core regions of many countries. Cities expanded, sub-urbanisation increased the size of the urban agglomerations, and congestion became a part of everyday life in urbanised regions. At the same time, however, many more peripheral regions lagged behind this rapid growth. It could even be argued that the core regions developed at the cost of the peripheral regions, leading to a flow of people and resources from the periphery to the core. Two types of regional policies were implemented in many countries to cope with the effects of these developments. The first type of policy dealt with urban renewal and firm relocation to the outer zones of the cities and beyond (sub-urbanisation). The second type of policy aimed at redirecting growth from central to peripheral regions. Firm migration was seen as a means to transfer work and prosperity to lagging regions, while at the same time easing the congestion, labour market and space capacity problems in the core regions. Instead of reducing regional disparities by means of a 'workers-to-the-work' policy, firm relocation can facilitate a 'work-to-the-workers' type of policy.

Summing up, we can state that all early studies share a prime interest in the *causes* of migration (push and pull) and the *impact* of migration on local and regional economies, including the *policy* options to stimulate these economies. On all three issues, the early studies bring us a great variety of knowledge. Especially for the UK shortage of labour in the original region is reported by most studies as the main reason for firms moving to assisted areas. The impact of firm relocation in terms of employment gains or losses receives is ambiguous. The employment effect of new firm formation, firm growth and firm decline, and even of firm closure is often regarded far more important than that of firm migration. Other insights which we gain from firm relocation studies in the nineteen sixties refer to (1) the low level of preparation of relocation decisions; (2) the scanty evaluation of alternative locations; and (3) the large differences which can be observed between movements of small and big firm establishments. This often corresponds with the difference between integral relocations (transfer moves) and the location of branch plants. The judgement regarding the policy dimension is cautious. The Cameron and Clark (1966) study, which of all early studies has the most heavy focus on

the policy dimension, reports contradictory indications with respect to the success of the government's regional policy instruments related to firm mobility.

UK dominance in studies on firm relocation in the nineteen seventies

The UK dominance of information about firm relocation in this early period leaps to the eye indeed. In the next period, the nineteen seventies, most international publications on firm migration still are UK based, but we also encounter some empirical evidence from the US, Germany and the Netherlands. In chronological order the major and most cited studies of the 1970s are from the already well-known Keeble (1971, 1972) and Townroe (1972, 1973) and furthermore from Lever (1972), Spooner (1972, 1974), North (1974), Sant (1975), Söderman (1975), Struyk and James (1975), Keeble again (1975, 1976), Rhodes and Moore (1976), Molle (1977), Jusenius and Ledebur (1977), Schmenner (1978), Bade (1979), Kruyt (1979) and finally Townroe again (1979). Struyk and James, Jusenius and Ledebur, and Schmenner deal with industrial mobility in the US, Söderman studies firm relocation cases in Sweden, Bade investigates firm relocation in Germany, and Molle and Kruyt describe firm relocation in the Netherlands, especially in and around the Amsterdam agglomeration. All other studies are primarily concerned with the UK.

Of course, the profound interest of British geographers and regional economists for the phenomenon of firm migration coincides with and is to be understood from the circumstance that UK regional policy during its heyday in the 1960s and 1970s relied heavily on steering manufacturing industry into assisted areas using the instruments of location controls, capital subsidies and labour subsidies. In fact, the British firm relocation studies are just part of the numerous studies in this period which attempted to estimate the effect of such policy instruments on the economy of the assisted areas (Armstrong and Taylor 2000, p. 370). Another factor that explains the dominance of British studies is the availability of complete and reliable data on firm relocation, on a national basis. The most productive British firm migration author David Keeble (1976, p. 117) explicitly recognises this when he states that the available evidence about most components of regional economic change in the UK is limited, but concerning relocation data for the manufacturing sector "British statistics and research are substantially in advance of those in most other countries". The resource he is referring to is a set of summary statistics on industrial movement in the period 1945-1965 which was originally published by the Board of Trade (later department of Industry, now Department of Trade; see Howard 1968) and later became supplemented with unpublished statistics holding increasing details and covering the period until 1971 (Townroe 1979, p. xiii). On the basis of these statistics Keeble establishes that many authors (he explicitly mentions

Luttrell) have underestimated the importance of firm migration. He refers to studies (a.o. Spooner) which show that in peripheral regions such as Cornwall, Devon and Wales more than a quarter of total employment in manufacturing is to be found in firms which immigrated there in the first post-war decades. For the UK as a whole it is interesting to see that in terms of employment, one third of all industrial movement (in the late 1960s) can be categorised as short distance spillover from the key conurbation's and 50% as long distance "between regions" moves to the periphery (Keeble 1976, p. 135). Furthermore, on the basis of a stepwise regression analysis Keeble concludes that "regional policy was the single most important variable influencing the sub-regional pattern of migrant industries between 1966 and 1971" (1976, p. 145). This conclusion contradicts Cameron and Clark's more cautious conclusion about the same issue for the prior decade.

At the end of the 1970s, Townroe supplements the abundant information about industrial firm relocation in the UK with information about the US. As he states, "research workers in the US have not been so fortunate in having an easily accessible database to work from" (1979, p. xiii). The US researchers have to use surveys and data collected by Dun and Bradstreet, as for instance in the studies of Struyk and James (1975), Jusenius and Ledebur (1977), and Schmenner (1978). Due to the lack of a national database none of these studies covers the US as a whole; usually they concern individual states or metropolitan regions like Ohio, Wisconsin and Cincinnati. Many publications are in the form of unofficial reports and not easily accessible; only a few articles in international journals have been published on firm migration in the US in this period (Logan 1970, King 1975). Townroe's book thus fills - for the US - an enormous information gap, but the significance of his book goes beyond that. He also analyses firm relocation facts in a theoretical perspective - behaviourally oriented, as could be expected at the end of the nineteen seventies - and he produces a first attempt to present a general (descriptive) model of the location decision making process. Finally, Townroe suggests that firm migration research should be integrated with studies on birth, growth, decline and death of firms to form a so-called components-of-change approach. As we now know, this suggestion has indeed been followed, and leads to what we now use to refer to as the demography of firms' approach. We will follow up on this issue below.

In retrospect, we can say that Townroe's 1979 survey of research results concerning the US and the UK ends a period in which these two countries and especially the last one dominated the international literature on firm migration research. Of course, the fact that U.S. and U.K. studies were originally published in the English language contributed to this situation. From 1979 on researchers on firm migration in other countries also started to publish in English. We already mentioned the studies of Söder-

man (1975) for Sweden, Bade (1979) for Germany, and Molle (1977) and Kruyt (1979) for the Netherlands. But citing these publications, which were the first in the English language, in fact is a lack of appreciation of a group of outside-UK studies published in the original languages of researchers in the North, West and South of Europe. Impelled by the same curiosity concerning spatial-economic changes and the same wonder about the results of regional policies - which in the post-war period revived throughout Europe - economic geographers and regional economists in many countries started to investigate the phenomenon of firm relocation. This was undoubtedly stimulated by the publications of their UK and US colleagues. In hindsight this period of the nineteen seventies may be considered as the florescence of classical firm migration research. Aydalot published results of firm migration research in France (Aydalot, 1972, 1978), Camagni and others i.e. Ortona and Santagata did the same for Italy (Ortona and Santagata, 1980, Ortona et al, 1981) - naturally with a heavy accent on the Italian Mezzogiorno, the main target area for Italian regional policy (Camagni 1976). Christiansen (1978, 1979) published results in Denmark. The Netherlands had a rather early but very complete industrial migration report by SISWO (1967) followed by a survey study by Pellenbarg (1976, 1977). Some information regarding Ireland, Belgium and Greece became also available. Klaassen and Molle deserve our appreciation for opening the content of all these original but not very accessible studies to the international scientific audience with their book on *Industrial mobility and migration in the European Community* (Klaassen and Molle 1983). Through this book for the first time a European survey of information concerning firm relocation became available, which permitted to draw some general conclusions.

A European survey

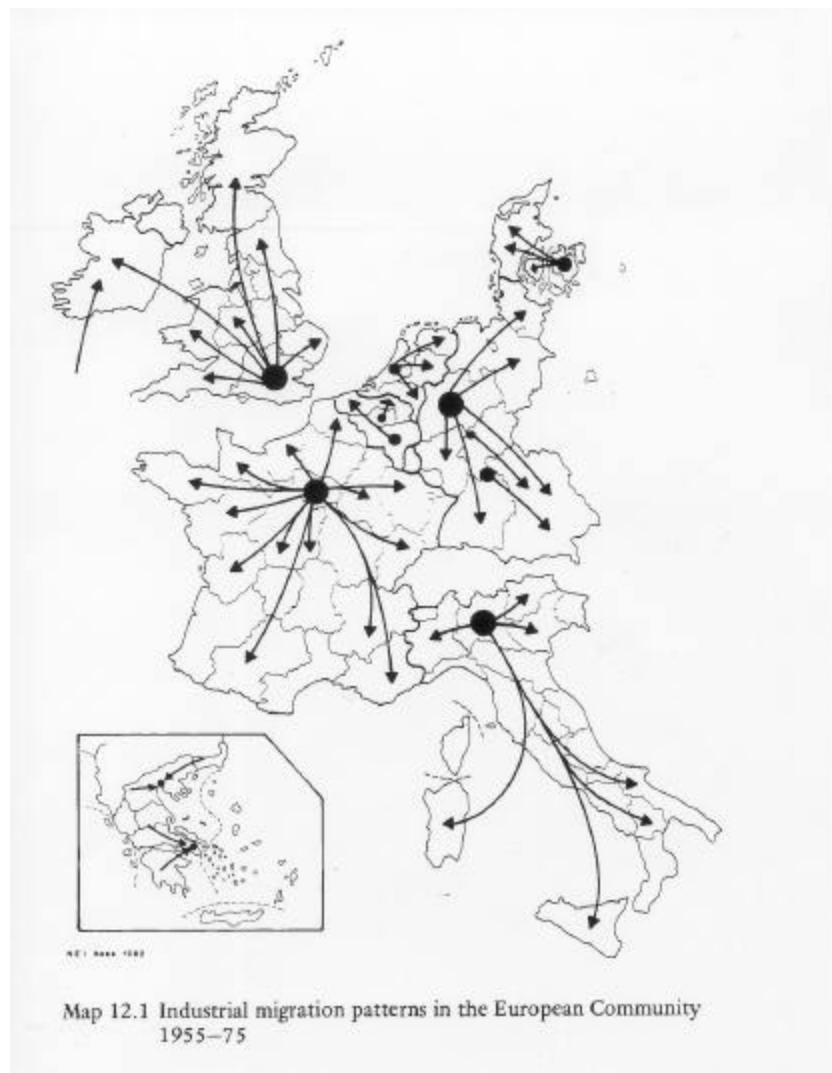
Klaassen en Molle's book presents information on firm migration in all EU member countries with the exception of Luxemburg. Each country is treated in a different chapter, and in the authors of the various chapters we recognise many of the researchers mentioned in the previous section, i.e. Townroe for the UK, Bade for Germany, Aydalot for France, Camagni for Italy, etceteras. We also recognise the complaints of these authors about the absence of firm migration registration systems, which are indeed repeated for most countries. A more interesting outcome of the European comparison is that in all countries the same bi-partition of firm migration is observable, viz. the "industrial sub-urbanisation" around the larger urban agglomerations on the one hand (short distance moves, mostly transfer moves) and on the other hand the "industrial decentralisation" (long distance moves, more often concerning the establishment of branch plants) from the economic core areas to peripheral and/or development areas.

Only Greece stands out as an exception, because it (still) shows a reverse movement: firms move from peripheral to central areas (Athens and Thessaloniki). Figure 1 shows Klaassen and Molle's generalised impression of the long distance decentralisation processes in Europe.

In most countries the research projects are concentrated on the manufacturing industry sector, apparently the most mobile sector of the nineteen sixties and seventies and at the same time in most countries the main target sector for regional development policies. Regarded from this policy perspective the long distance moves are of course the most interesting category. Only for the Netherlands and for the UK suitable information is available (for the nineteen fifties and sixties, respectively) that allow this type of analysis as shown by SISWO (1967) and Keeble (1976).

All European researchers agree about the nature of the driving forces behind the firm relocation processes. Lack of space, transport related issues, and labour market problems dominate the picture. The first two are the main causes for short distance moves in and around the urban core areas, while labour shortage is the dominant motive for long distance movements to development areas in national peripheries. However, In the course of the 1970s the importance of the labour market motive decreased. Due to the economic recession unemployed went up sharply and labour shortages rapidly disappeared in almost all regions. For various countries 1974 is indicated as the year of the trend rupture. After this, the magnitude of long distance relocation decreased. There are two reasons for this trend. First, the economic recession had various negative effects. Firm mobility is related to firm growth, and tends to diminish in an economic recession. Firms are less likely to take far going investment decisions like a re-location when the future economic prospects are rather uncertain. The economic recession also had negative effects on redistribution policies. Redistribution of economic growth is a luxury problem. Without economic growth there is nothing to redistribute, and therefore these regional policies were abandoned in the recession period following the oil crisis of 1973. A second reason for the downward trend in long distance firm relocations was due to the longer term cumulative effects of redistribution of economic growth in the previous periods. For the Netherlands, Pellenbarg (1976, 1985) argued that the gradual rise of income and education levels in the 1960s and 1970s, especially in the more peripheral parts of the country, effectively diminished the potential of such regions to attract industrial branch plants, many of which are routine production facilities looking for cheap and low skilled labour locations. No doubt, the same argument applied to other European countries in the same period.

Figure 1
Industrial migration patterns in the European Community 1955-1975



Source: Klaassen and Molle (1983)

In the synopsis of their European survey Klaassen and Molle (1983) don't pay too much attention to the regional policy dimension. They conclude that with the change of the economic tide policy attention has shifted from influencing relocations to stimulating other components of economic change, especially new firms (birth) and growth. In this respect, new concepts were developed such as the seedbed, or incubator functions of regions. The work of David Birch (1979) who showed that in the US small and medium sized firms and especially newly established firms created unexpected rates of employment growth, lead to a massive growth of interest of both researchers and policy makers in the where and how of new firm creation. The dominant theory about the relationship between firm birth and location at that time being the incubation hypothesis (Hoover and Vernon 1962, Leone and Struyck 1976) it is not surprising to see that the interest in new firms of the late 1970s and early 1980s coincides with interest in cities. The core urban regions of the country were increasingly viewed as the engines of economic growth, and less attention was given to redistribution policies.

Despite this change of atmosphere, as observed by Klaassen and Molle it cannot be denied that for many regions firm relocation has contributed considerably to employment growth. In the previous paragraph we already referred to studies which show that in the UK a considerable part of total employment in regions such as Cornwall, Devon and Wales is to be found in immigrant firms. For the Netherlands comparable results are reported for a number of regions varying in size and peripherality, but here the figures are more modest than in the UK. Parts of the provinces of Overijssel and North Brabant reach a percentage of 10% of industrial employment due to firm immigration over a post-war period of 25 years (Pellenbarg 1985) which is considerably less than the 25-30% reported for Cornwall, Devon and Wales.

A final observation from the collection of research notes in Klaassen and Molle's book is that several of the authors reveal an increasing criticism regarding the reliability of research results concerning migration motives. Especially Aydalot and also Bade are very explicit on this issue. They refer to the many reasons why data from enquiries and interviews will not reflect reality: job mobility of decision makers, memory problems, rationalisation of choices, inconsistency between stated and revealed preferences, disability to differentiate between factor influences on different geographical scales, etceteras. Pellenbarg (1985) has demonstrated a strong difference between actual and perceived location qualities in firm relocation processes quite clearly for the Netherlands. An alternative road to understanding firm migration motives which avoids the uncertainties attached to human statements is of course to use quantitative models in which firm relocation data are explained from regional variations in land prices, labour market conditions, investment facilities etceteras. This is the approach used by Keeble

(1976) which lead to his conclusion about the apparent success of regional policy in the UK. Molle (1977) carried out comparable calculations for firm migration data in the Amsterdam conurbation. In fact these are "macro" approaches, using regionally aggregated data. In section 5 we will present an alternative modelling approach to understand the factors causing firm relocation, which uses micro data.

The nineteen eighties: from the regional to the urban level

In the nineteen eighties, the number of international firm migration studies becomes much smaller, compared to the number of studies in the seventies. Molle (1981) and Klaassen and Molle (1983) present their European survey studies, and next to this there are journal articles by Bade (1983) and Erickson and Wasylenko (1981).

The latter authors describe relocation considerations of central city firms. Also Ortona and Santagata (1981, 1983) choose the scale of the urban region for their investigations. They describe the influence of local land use policy on industrial mobility in the Turin region. As Pen (1999) argues, their publication stands out because they pay not only attention to government influence on firm migration in the context of regional (development) policy, but also refers to other policy types such as environmental policy, urban renewal policy, local development policy, etceteras. Just like regional policy, these other policy fields may be expected to result in firm relocations. For most of these new policies the urban agglomeration is the most relevant playing field, and local (and regional) governments are much more involved in policy formulation and its policy consequences than national governments. At the same time we witness a strong increase of short distance migration. While long distance migration decreased for a number of reasons indicated above, the reverse was true short distance migration. The underlying causes can be related to the process of sub-urbanisation of firms, propelled by space shortage and increasing land prices in the large cities, parking problems, and growing congestion on city roads and beltways. No wonder that the urban firm exodus swelled, and that that city governments worried about the ensuing erosion of urban employment. The politicians problems were even more complex because some of the government's own policies, especially environmental policy and urban renewal policy, in fact reinforce the pressure on firms to leave urban locations. In this context, it is easily understood that firm relocation studies from the 1980s onwards concentrate more heavily on urban agglomerations, and less on the balance between central and peripheral regions in a national context. Furthermore, one should expect an increasing attention for the studies taking into account government policy, but the number of scientific publications in this field are relatively scarce in eighties. But maybe this observation is obscured by the fact

that in practice nowadays many urban-oriented firm relocation studies are unpublished contract-research based reports written by consultancy firms. A recent example of a major policy-oriented firm migration study is the PhD-thesis of Ebels (1997) who considers the impact on firm relocation of the urban renewal policies in the Dutch cities of Amsterdam and Rotterdam. He mentions Elias and Keogh (1982), Scott (1982) and Suarez-Villa (1989) as sources of comparable information for the UK and the US. For Asia, there is a study describing industrial relocation in the urban area of Seoul (Rwon 1981).

Looking back, we may conclude that for most modern countries urban renewal in its classical form (rebuilding and revitalising nineteenth century urban areas) has been a temporary activity, and consequently the same is true for the attached sub-urbanisation of inner city activities, mainly small scale manufacturing, trade and wholesale. In many cities, however, some large scale manufacturing sites - sometimes extensively used because of the shrinking scale of production activities - stay behind in the central parts of urban areas, like stranded whales on the beach. The "outplacement" of such old industrial plants is an important task for the next decades, needed to create new space for urban development, and an interesting new research field for firm migration experts. At the same time the majority of firms which leave the city are no longer industrial or wholesale firms, but business services. Hence it is not surprising to see that firm migration research in the nineteen nineties shifts its attention to this fast growing and most mobile sector.

The nineteen nineties: new data and new approaches

In the nineties, the lessons of earlier decades are learned. The interest in firm relocation as a panacea for regional development has faded and instead, it is now felt that regions should create the conditions for innovation and creation of new economic activities. Or, if they lack the resources to do this, effective regional subsidies should be given to them, in order to build the required infrastructure, knowledge centres etc. The Regional Funds of the European Union are a clear example of such a policy instrument. Key concepts underlying the new policy adagium are regional agglomeration effects, endogenous growth, regional knowledge networks, and learning regions. They all have one tune in common, and that is that space matters for economic growth. In this view, the focus is still on new economic activities, as in the 1980s, but there is also an emphasis on sustained economic growth. Only half of the new firms survive after ten years, and the conditions for survival of innovations and new firms are as important as those for the creation process itself. In this process of bringing new ideas to maturity or new and small firms to larger corporations, the spatial and regional conditions may be important as well.

Firm migration then may be considered as a locational strategy for removing restrictions to firm growth. This brings the issue of firm migration studies again to the fore, but this time as the consequence of the coming of age of generations of new firms developing various locational strategies for coping with sustained growth.

The new viewpoints in policy and research coincide with a turn in interest with respect to the most relevant economic sectors. From a firm relocation point of view, one could say that the sectors of manufacturing industry, wholesale and business services (offices) have left the city in a sort of outward procession, of which the order has been dictated by the intensity of their land use. In the first post-war decades, the interest in industrial movement was of course partly due to the then more dominant position of manufacturing industry in the employment structure. But manufacturing also was the most mobile sector of that period. For its growth it needed space, which was made available at specially developed industrial sites (in fact in most countries a new, post-war phenomenon) at the city fringes, in suburban locations, or in more distant development nodes, at prices which were affordable for this sector, of which the more traditional branches need a large acreage per worker. Before long, the wholesale sector followed the industrial exodus, and soon even outsized it. In the second half of the 1960s the Amsterdam Bureau of Statistics already counted a number of emigrant wholesale firms which was twice the number of emigrant industrial firms (Pellenbarg 1976). At that time, the number of business services leaving Amsterdam was still very modest, but this was to change in the next decades. The multi-storey offices of the business services sector, using their square miles much more efficiently than ground floor facilities for production, storage or distribution, kept their positions in the central parts of urban areas longer. But in the course of the 1980s and 1990s they inserted in the urban overspill process too, and soon dominated it. Especially in the second part of the 1980s, when the economic recession was over, a huge demand for new office space arose, catching up the investment arrears of the past period. This led to a massive relocation of business services to business parks at city fringes and in suburbs, lining the urban beltways and growing into the office corridors which we now face along most city entrances.

For the Netherlands, this process is documented rather well, in the so-called Mutation Balance system which has been set up by the Union of Dutch Chambers of Commerce (VVK), and described in a series of articles by Kemper and Pellenbarg (for a synopsis see Pellenbarg and Kemper 1999). Table 1 presents the latest available and published figures.

If we ignore the category "other services" (mostly financial services, many of which are holding companies leading only a paper existence which makes them all the more mobile) it is clear that commercial (business) services are by far the most mobile sector, both in absolute numbers and by migration rate. In the wholesale sector the migration rate is still very high as well, but the absolute numbers of moving firms are smaller. Construction and manufacturing are relatively less mobile, and the retail sector seems to be the stickiest sector. This sector has a high mutation rate but mutations normally take the form of openings and shutdowns much more than relocations.

Table 1.
Firm mobility in the Netherlands

	Number of moved firms		migration factor 1995*		
	1994	1995	short distance	long distance	total
manufacturing	3,700	3,950	5.8	1.6	7.4
construction	3,620	4,250	6.6	1.1	7.7
wholesale	9,300	9,800	7.4	2.7	10.1
retail	6,280	6,550	3.6	0.6	4.2
commercial services (a)	16,800	18,400	7.6	2.4	10.0
personal services (b)	5,300	5,750	4.2	0.9	5.1
other (c)	18,000	19,000	6.3	3.0	9.3
TOTAL	63,000	67,700	5.9	1.9	7.9
Total 1993		58,000	5.7	1.8	7.4
Total 1991		54,000	5.5	1.8	7.3
Total 1989		43,000	5.3	1.4	6.7
Total 1987		36,000	4.9	1.2	6.1

(a) transportation, storage, communication, banking and insurance, business services

(b) hotels/restaurants, sports and recreation, house agents, laundry, hairdressing etc.

(c) mainly financial holdings

(*) short distance: migration within Chamber of Commerce district; long: to another district

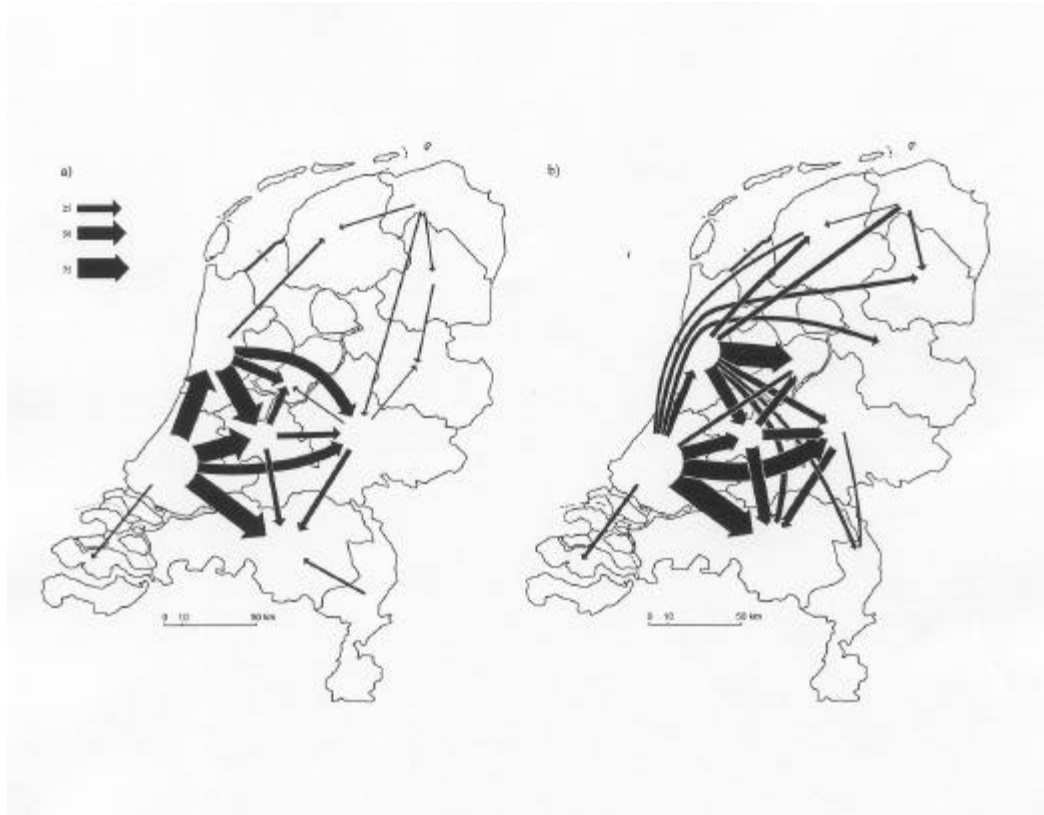
Source: Kemper and Pellenbarg (1997)

Figure 2 shows the firm relocations in the Netherlands in the 1990s in the form of a map with origins and destinations of long distance relocations. Long distance is defined as a move across provincial border and thus all short distance relocations in and between municipalities, including the majority of the "economic sub-urbanisation" around the major cities, are omitted in this map. Even then it is clear that firm relocation over very long distances hardly occurs: there are no streams of any importance from the core to the periphery. Firm migrations concentrate in the economic core area of the Randstad Holland (the three western provinces, with 50% of the nation's population and economic activity). However, the maps also indicate a process of "fanning out" from the Randstad to the adjoining provinces of Flevoland, Gelderland and North Brabant, a process which seems to stretch farther out in the course of the 1990s (if we compare maps a and b). Hessels PhD study concerning the locational dynamics of business services in the Randstad Holland gives a more detailed analysis of what is happening (Hessels 1992). Both the intensity and the increasing scale of the economic sub-urbanisation process in this office sector are explained mainly by accessibility-related factors. Car-accessibility and parking space are the most important variables. Generally, the induced mobility aspects of firm location get a more central place in firm relocation research in the 1990s, which of course reflects the gravity of growing mobility and traffic problems in most western countries. In the Netherlands, Van Wee was the first to study the mobility effects of firm migration, especially effects of firm relocations to public transport stations on travel behaviour of employees (Van Wee 1997). It is not very likely that firm relocations lead to a reduction in traffic. Broersma and Van Dijk (2001ab) show that in the nineties the spatial distribution of the locations of jobs becomes more uneven, where the spatial distribution of the working population becomes more even. As a result the interregional commuting streams in the Netherlands almost doubled between 1987 and 1998 (Ekamper and Van Wissen, 2000).

Possibly the most interesting and rewarding new research theme of the 1990s is the new interest in the process of firm decision making. In fact, the identification of push-, pull- and keep-factors only gives a superficial kind of explanation of firm relocation processes, a very partial insight into how relocation decisions are really made. There is a need to dig to a deeper level of explanation, which takes into consideration how decision processes regarding firm migration develop in more detail, and which constraints have to be met during these processes, by the decision makers. In section 2 we already indicated the interest in decision processes which springs from the behavioural approach. Already in the 1970s Townroe, representing this approach, developed a model with five successive decision stages, viz. 1) stimulus, 2) problem definition, 3) search, 4) formulation and comparison of alternatives, and 5) choice and action.

Figure 2

Interprovincial firm migrations in manufacturing, wholesale and commercial services, annual average a) 1990/91 b) 1994/95



Source: Kemper and Pellenbarg (1997)

The choice-stage was further divided into eight subsequent steps (Townroe 1973). Later, other authors have produced even more complicated models of the location decision making process (see among others Lloyd and Dicken 1977, p. 330). The application of their schemes and models in empirical research was scarce. Consequently, the knowledge about location decision processes continued to be normative and descriptive, and remained untested. However, the 1990s witness a revival of interest in this process aspect of firm migration decisions. Recently, Louw gave a good example of a practical application of decision stage models in his PhD thesis about locational choice behaviour of (migrating) large offices in the Netherlands (Louw 1996). Louw divided the decision making process into three phases, viz. an orientation phase, a selection phase and a negotiation phase. This roughly corresponds to the phases 3, 4 and 5 of Townroe. It turns out then, that "spatial factors" (these are geographical position, accessibility, parking possibilities, proximity of facilities & public transport, and quality of the spatial surroundings) play an important part in the first two phases, whereas financial and contractual factors are getting more important in the third phase, when it comes to negotiating a result (table 2). The dominance of spatial factors in the search process is most important for firms that want to own their site and building, and relatively less important in case a firm rents its premises.

Table 2.
Factors in the location search process, mentioned by managers
(percentage of all factors mentioned, per search phase)

Phase:	orientation	selection	negotiation	total
Factor:				
Building factors	15.3	12.3	7.1	11.9
Functional factors	19.4	18.4	7.1	16.1
Technical factors	3.1	4.2	2.0	3.4
Financial factors	12.2	14.2	52.5	22.5
Location factors	43.9	36.0	12.1	32.3
Other factors	6.1	14.6	19.2	13.8
Total	100%	100%	100%	100%

Source: Louw (1996)

It is quite remarkable that in Louw's study the average number of location factors mentioned per respondent varies considerably from one decision stage to the other: 2.5 for the orientation phase, 6.1 for the selection phase, and 2.5 again for the negotiation phase. Obviously, in the orientation phase the search is of a superficial nature. Managers only pay attention to two things: the number of square meters that are available (rather logical, in view of the importance of expansion space problems as relocation factor number one) and the price for which the location/building is for sale or rent. In the selection phase a much greater number of factors are considered. Again price is important, but on top of that many spatial factors are now entering the scene: location/situation, accessibility - for car as well as by public transport - parking, and possibilities for flexible use of space. In the third and final phase the negotiations then focus again on one or two key issues, of which the price issue always is predominant. When asked (by Louw, in his interviews) for an ex-post evaluation the managers usually demonstrate satisfaction about the outcome of the negotiations, but in two third of the cases they nevertheless keep the feeling that they've had to compromise. Most of the compromises are about the price and about the parking facilities.

Louw's process-oriented approach of firm relocation decisions had been followed up in recent years by Pen (1999, 2000). In a study based on an extensive enquiry among over 1000 individual firms he considers relocation as one of six types of location strategies. He finds that the average length of the decision making process is much longer than often assumed (on average 2 years) and shows that the number of stages in the decision process varies from a minimum of three till a maximum of seven. After factor analysis Pen's results suggest that the relocation process is triggered by a combination of firm internal and external developments and not in the first place by lack of space for expansion and accessibility per se. This is in contrast to the dominant outcome based on answers from decision-makers on more straightforward survey questions. Interestingly, the importance of individual factors seems to be related to the length of the process. For example, the influence of government prevails in the short three step decision processes, while personal considerations are more important in five phased processes (Pen 2000, p. 23).

From the previous paragraphs we may conclude that still many things are not known about the decision making process of firms in general and with regard to firm relocation in particular. The methodology used in these studies fits in the tradition of firm migration research with the use of rather descriptive methods. In the next paragraph we will present an example of a study in which some of these issues are analysed by means of more rigorous statistical models using a data set with information of individual Dutch firms.

4 Modelling firm relocation: an ordered logit approach

In the foregoing three strands of theoretical aspects with regard to firm relocation are discussed and also an overview is given of the empirical studies since World War II. Besides location factors that are traditionally used for the explanation of firm relocation, it is argued that also firm internal factors as institutional factors like government policy may contribute significantly to the explanation of firm relocation. Another important issue is that determining an optimal location along the lines of the simple neo-classical model is often less appropriate for the explanation of firm relocation because the latter is by definition heavily influenced by the situation at the location before the move. This past behaviour (path dependency) in combination with the expected future developments of the firm and the environment requires a more dynamic type of theoretical framework in which behavioural and evolutionary elements play a more prominent role. The decision process for firm relocation is a very complicated process in which several stages can be distinguished. In each stage another set of variables can be the most important factor. Another issue is that most studies of firm relocation are of a rather descriptive nature, where nowadays more rigorous statistical methods could be applied to test hypothesis derived from the theoretical approaches described in section 2.

In this section we will summarise the result of a Dutch study in which an empirical model for the explanation of the stated preference of firms to move to another location is estimated based on micro data for Dutch firms (Van Dijk and Pellenbarg, 2000c). Although this study does not take into account the different stages in the decision process, it is in our view a useful example to show how statistical methods can be used to get more insight in the extent to which the various theoretical notions mentioned before can be empirically verified. The stated preference of the firms with regard to migration in this model is related to a set of variables according to the subdivision in three categories suggested by Lloyd and Dicken (1977):

- firm internal factors
- location factors (site and situation)
- firm external factors

In each of these categories variables can be used for which the inclusion in the model can be justified by at least one of three types of theories mentioned in section 2. For some variables it is difficult to assign them to one of the three categories. For instance, ownership of the building can be seen as a firm internal factor, but also as a site characteristic.

Hence, we adopt an eclectic approach for the operationalisation of the explanatory variables in the empirical model.

Before turning to the empirical results, some remarks will be made about the data and the model. The analysis is based on a very rich micro data set derived from regular surveys among the panel of firms managed by the Faculty of Spatial Sciences of the University of Groningen. We use data for 1338 firms that we questioned in 1995/1996. A detailed description of the data can be found in Van Steen (1998a). Due to the panel character of the data for most firms in the sample we have also information at earlier points in time.

From the survey we know the actual (spatial) behaviour of firms for each year from 1980 and also the propensity to move within the next two years. We have detailed information about the present location characteristics of firms and this information can be used to explain future migration. If firms moved in previous years the present location is the final result. In this paper we will focus on the stated preference of the firms with regard to migration. Firms were asked to indicate the probability of moving in 1996 or 1997. They could choose from the following categories: 0%, 0-10%, 10-25%, 25-50%, 50-75%, 75-90%, 90-100% and 100%. For the empirical analysis we interpret this at that the respondent expresses a preference with an ordinal ranking. There is no significance to the unit distance between the set of observed values. With this eight categories the dependent variable $y = \text{PMOVE}$ can take values between 0 and 7. Of all firms 60% answered that they will certainly not move in the next two years. Almost a quarter shows a propensity to move of less than 10% and about 10% indicate that there is a chance of more than 25% that they will move to another location.

For this type of dependent variable the ordered probability model is a suitable tool of analyses (see Greene, 1995, p. 469-481). The two alternative model types, the ordered logit and the ordered probit, give more or less the same results, up to a scale factor. The description of the results below is based on the logit model. The ordered logit model is a form of regression model in which the dependent variable is an ordinal variable. Estimation of the ordered logit model has been done with LIMDEP version 7. For details about the estimation procedure and the interpretation of the results see Greene (1995, p. 469-481 and 1997, p.672-676).

Next we will summarise the empirical outcomes in relation to the theoretically expected sign of the explanatory variables that are subdivided in the three categories internal factors, location factors and firm external factors. For a more detailed description of the theoretically expected signs, the model selection process and the empirical outcomes see Van Dijk and Pellenbarg (2000c).

Firm internal factors: economic sector, firm size (number of employees) and previous migration behaviour.

We expect that the industrial sector will have a lower probability of moving than the service sectors. The costs of moving are generally higher for the industrial sector, because the investment in capital stock and the capital intensity is higher. With regard to the service sector the costs of moving can be very high if they move over a long distance when it implies that a large part of their personal does not move with the firm. In that case the hiring, firing and training cost can be very high and make relocation over a long distance unattractive. For short distance moves these costs are probably fairly low for the service sector. Theoretically, we expect the mobility of the construction, wholesale and transport sector somewhere in between the industrial and the service sector. For the firms in the sector retail and horeca (hotels restaurants and bars) we expect that they are most of the time sticking to the present location because they are tied to the local market. Firms in this sector are traditionally clusterers because they serve customers who economise on travel by doing multipurpose shopping, or, seeking food or shelter where there are many providers to minimise shoppers' discouragement. As a result the propensity to move is expected to be much lower for retail and horeca than for the industrial sector. This last hypothesis is indeed confirmed in the empirical model, but for the other sectors no significant differences are found.

With regard to the *size of the firm* we expect that small firms can move more easily to another location than large firms, because the costs of moving and the organisational problems for small firms are expected to be much less than for large firms. Besides that the size of the firm is an indicator for the absolute costs of relocation, the size of the firm may also reflect the stage in the life cycle of a firm. Particular areas can be a very productive firm nursery, birthing firms at higher rates and sending them out as they grow out of their small city spaces. Location theory suggests that as firms expand, not only might they relocate to a larger space, but also tend to a site with different characteristics than the one it was in at the time of birth (see section 2). An increase in activities for small firms may lead much earlier to problems with the present location than for big firms, who probably have more flexibility to find solutions at the present location. From a firm demographic perspective we may also hypothesise that the propensity to migrate is smaller for larger firms. This is because firm growth, one of the most important determinants of firm relocation, is higher for small than for large firms (Caves, 1998). The empirical results show that firms with less than ten employees indeed show a higher propensity to move, but for all the other categories no significant differences are obtained.

Another indicator for the stage in the life cycle of the firm is the variable *previous migration*. A move in the past may reduce the necessity to move again, but this does not imply that the longer a firm is at the present location the higher the need to move. There might be a difference between firms with a stable size and firms who are growing or shrinking. Rapidly growing firms may need repeated changes of location. The latter is confirmed by the empirical results. Previous migration turns out to be significant for firms who moved during the last ten years. Firms who moved to another location between 1986 and 1990 are now considering a new relocation much more often than firms who did not move before, whereas firms who moved after 1990 show a much low propensity to move (coefficient significant at the 1% level).

Location factors (site and situation)

Based on the location theories in section 2 this type of variables should be the most important for the (re-)location decision process. Therefore, and because the data permit this, in this paper we will pay a lot of attention to this type of variables. We used about 15 variables reflecting the location in the urban field, various types of enterprise zones, access to infrastructural facilities, and ownership of the building. The empirical results for the variables describing the location in the urban area (city centre, city border, residential area or country side) indicate a higher propensity to move only for firms currently located at the city border. The various types of enterprise zones/industrial sites did not show significant results, with the exception of the industrial site for heavy industry where firms show a significant lower propensity to move. Firms at this type of location are often rather capital intensive and this implies high cost of moving. Furthermore, for this type of firm the availability of alternative locations is often limited. None of the infrastructure variables, which reflect the nearness to roads and public transport, turned out to be significant at conventional levels. Even in the case that the infrastructure variables are the only variables in the model none of the coefficients were significant. This is surprising because accessibility is considered to be an important location characteristic in many studies. The empirical results confirm the expectation that owners of the building are less likely to move to another location than firms who rent the building, because the cost of getting rid of the present building are much higher for owners.

A somewhat different kind of variables in the category 'site and situation' are the category of variables that do not reflect characteristics of the present location, but reflect to what extent firms think that hypothetical changes might affect the suitability of the present location. It indicates the type and magnitude of changes in the firm and/or the location that may lead to a decision to relocate. Based on about 20 questions a composite variable is

constructed which serves as a proxy for the possibility to adjust to changes at the present location. The composite variable can be labelled 'stress tolerance threshold' or 'location stress'. Possible changes which are suggested that they might affect the suitability of the present location (cf. Krumme, 1969b: the possibilities for intra-site change) are: growth of the number of employees, the accessibility, increasing criminality, government policy with regard to the environment and spatial planning and finally, investment premiums and lower rents at another location. The second variable in this category is the answer to the question whether or not a revitalisation of the direct environment is needed in the opinion of the firm. We expect that firms who face a high location stress and/or see an urgent need that the present environment of the firm needs revitalisation. The results for both variables are highly significant at the 1%-level and this implies that location stress and a strong plea for revitalisation of the direct environment are the most important determinants of the propensity to move. Because location stress is in this analysis a composite variable, in a later study we will try to include more disaggregated variables for location stress to unravel which stress factors are most important.

Firm external factors

With regard to these factors we took into account differences in economic performance and the regional labour market situation by means of a set of regional dummies (12 provinces) and the opinion of firms about government policy. We expect that the need for relocation will be lower in the peripheral areas, because in these provinces there is generally ample expansion room. However, a counter argument is that growing firms in the periphery have higher needs to move to the central part of the country because they need a location closer to the market or to facilities like a major international airport or harbour. The empirical results support the first hypothesis: firms located in the southern part of the country and to a lesser extent in the northern provinces show a lower propensity to move to another location than firms located in the economic core area of the Netherlands (The Randstad).

In the Netherlands government policy can make rather strict rules in spatial planning and with regard to, for instance, environmental limits for pollution and noise. On the one hand we expect that firms who have a positive opinion about government policy will be less inclined to move to another location. On the other hand firms may be stimulated to move to another location when government policy creates attractive (and sometimes subsidised) locations to move to. In the questionnaire firms are asked to give their opinion on a scale from 1 to 10 about, respectively, the EU-policy, the national policy and about the policy at the regional (province) and the local (municipality) level (see Van Steen 1998b for details). However, with regard to the opinion of firms about government policy no significant results

are obtained. With regard to the firm external factors we can conclude that the variables we used for the operationalisation are not very important for the decision to relocate. We hesitate to conclude that external factors are not important at all, because we did not include variables that reflect more specific factors like the labour market situation for certain skills, distance to subcontractor's etc.

Although on the basis of the present analysis we can only draw tentative conclusions, our results support the view that the relocation decision of a firm is mainly determined by firm internal factors and to a lesser extent by site related factors. The importance of the variables firm size, retail and horeca and previous migration support this view. The results that the location stress indicator and the need for revitalisation are very important factors seem to contradict with this outcome. However, in the composite variable location stress, questions related to internal factors play prominent roles. The location factor ownership of the building can also be seen as a firm internal factor when it is interpreted as an investment in fixed capital. However, before we can draw a reaching conclusion about the dominance of firm internal factors a more in depth analysis is necessary.

5 Conclusions and suggestions for pushing the research frontier

In the preceding paragraphs, we evaluated both theoretical and empirical findings concerning firm relocation. The theoretical as well as the practical approach learned that both firm internal and external factors have to be considered to understand and predict firm migration as a spatial-economic phenomenon. Also attention should be paid to institutional factors like the various types of government policy. The research approach of population demographics may be taken as an example and a more general directive for firm migration research, because in recent years a demographic approach to firm dynamics has gained popularity (Van Dijk and Pellenbarg 2000a). This approach, which is studied both by geographers, sociologists and economists is called industrial demography, demography of the firm or enterprise, or economic demography (Van Wissen, 2000a). Some studies focus on changes at the macro-level of the population, as a result of processes of birth, death, migration, as well as growth/decline and ageing of existing firms. Firm relocation is one component of change of a (regional or national) population of firms. In this respect, the contribution of the relocation component to the change in the size and composition of the population is studied. An example of such a macro-level study based on a micro-simulation model can be found in Van Wissen (2000b). In another type of studies firm demographic events are "explained" in terms of

firm age, size and growth, or more generally, in terms of the life cycle of the firm by means of using micro data sets of individual firms. Examples of such studies are Van Dijk and Pellenbarg (2000c) on firm migration (summarised in section 5) and List and McHone (2000) on the impact of air quality regulations on 'dirty' firm births.

A number of themes can be mentioned that have not yet been clarified, or not yet sufficiently clarified, by firm migration research in the past decades. Especially the influence of internal factors has been neglected too much in the past. Notwithstanding the ever-recurrent conclusion that the need for expansion is push factor number one, the resulting idea that firm migration is in the first place an attempt to adjust to firm internal dynamics stayed in the background. Firm migration research questions tended to be dominated by valuations of the firm's external environment, not by the analysis of its internal structure and dynamics. A change is taking place now. New research endeavours concentrate on the firm internal dynamics and try to discover the content and process characteristics of the underlying strategic decision making. When firm relocation is indeed mainly determined by firm internal factors this implies that the translation to policy might be much more difficult than when the main determinants should be related to specific types of locations or firm external factors. On the other hand, life-cycle oriented firm demographic research should be advocated as a basis for future-oriented spatial planning.

An important hypothesis to test is whether firm migrations are concentrated in those phases of the life cycle in which significant growth occurs. Although there is much ad hoc evidence for this hypothesis, from surveys, a rigorous testing at the level of the population has yet to be undertaken. Such a study should take into account the studies on the relationship between firm growth on the one hand, and age and size on the other. The literature on this topic is voluminous, but far from conclusive (Carroll and Hannan, 2000). Many studies find a negative relation between age and growth: older firms have a smaller growth rate than young firms. Moreover, it is also often found that larger firms have a smaller growth rate than small firms. A complicating factor in these studies is that age and size of the firm are highly correlated, so that the separate effects of both are difficult to disentangle. A process- and model-oriented approach reflects reality and eventually will produce more tools to influence and control reality. After all, the decision on a relocation of a firm in reality is not a snapshot happening, isolated in time, but indeed a process with many phases, in each of which a choice has to be made between different alternatives for management behaviour. A *stepwise approach* in model building would give a more realistic expression of that process. It is certainly a challenge to firm migration research to develop such multi-phase models in the future. Another related challenge would be the development of models that are able to negotiate the influence of

factors on the different organisational levels on which they are exerted. i.e. the entrepreneur, the firm, the production environment, and the region. Such a *multi-level analysis* approach is advocated by Van Oort et al (2000) and would resemble a corresponding development which has been observable in population demographics (i.e. De Bruijn 1999).

These types of studies can benefit from longitudinal data where all firm demographic events are taken into account. Fortunately, new and indispensable data sources on firm mobility are gradually becoming available for use in the demography of firms' approach, such as the CREDO database in the UK, and the Mutation Balance and LISA data for the Netherlands. In Italy, the Movimprese database is an example that holds potential to be useful for the analysis of firm relocation. GIS-techniques offer new possibilities to combine firm relocation data with other spatial data sets that are increasingly becoming available in digital format. The combination of new data, new techniques and above all: new questions will enable firm relocation researchers to reach higher levels of understanding the subject of their studies.

Another topic that needs more attention is the study of firm mobility on the local scale. On the one hand the lack of interest in research for the local scale is understandable because of the smaller impact of local moves on employment structures. On the other hand the relative ignorance of the local moves is to be pitied, because from them a lot can be learned about the basic causes of firm relocation, and the course of the inherent decision process. In almost all cases, firms consider a local move *before* eventually deciding upon a move over greater distances, so it is very much worth while to know more about this phase. Furthermore, firm relocations over short distances can be very important in order to facilitate adjustment processes in the local economy (Van Dijk and Pellenbarg 2000b, p. 331). At the other end of the spatial scale also international firm migrations deserve more attention, at least where this concerns the relocation of small and medium sized single plant firms, on which we concentrate in this chapter. This suggestion rests on the consideration that the growing internationalisation of business gradually will bring relocation strategies of many small and medium sized firms on a higher level, closer to that of the multinational enterprises. This is certainly observable in Europe, where the inner borders of the European Union have been opened since 1992 and the Union expands to embrace more and more countries. This leads to a greater number of - also smaller - firms to consider alternative locations outside their home country, to handle at least part of their activities for which such alternative locations are more attractive than the present one (Van Dijk and Pellenbarg 2000b, p. 332).

Another theme that deserves more study, next to the local and international moves, is the sometime contradicting interest of firm strategies and regional government

strategies with respect to relocation, as has recently brought forward by Lagendijk (2000). He presents regional case studies (the Tyneside region and the Bergisches Land) which show how a firm's interest can be to leave, whereas the region's interest is that the firm stays. An interesting question is to what extent such interests can be made compatible or even prevented. Is locational stress, if detected early, "curable"? How can a policy be devised in which firms are "anchored" in the region? More policy-oriented studies taking this view into account are surely needed. A better understanding and possible forecasting of firm demographic events will be of great value for spatial policy and planning. It facilitates the proper planning of business sites in quantities and qualities which will adequately meet demand. This is a matter of growing urgency for the firm due to the increase of specific locational demands by individual firms, but also necessary for adequate spatial planning and economic development programs of the government. The firm demographic approach holds much potential for developing models which are able to more precisely predict firm migration developments in the future, enabling local and regional governments to take the future demands for space and infrastructure more precisely into account.

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